

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

5 Claims 1-23 (Cancelled)

Claim 24 (Currently Amended): An apparatus for automatically determining a type of an external device, comprising:

 a jack for coupling the external device;

10 an impedance detecting circuit, coupled to the external device through the jack, for generating a first analog signal according to an impedance of the external device and a first resistance, a second analog signal according to the impedance of the external device and a second resistance and a third analog signal according to the impedance of the external device and a third resistance, wherein the first, second
15 and third resistances are different;

 an analog-to-digital converter, coupled to the impedance detecting circuit, for converting the first, second and third analog signals to first, second and third digital values, respectively; and

 a control circuit, coupled to the analog-to-digital converter, for determining the type
20 of the external device when the first digital value falls within a first predetermined range, the second digital value falls within a second predetermined range, the third digital value falls within a third predetermined range and all of the first, second and third predetermined ranges together indicate a same recognized condition among a plurality of predetermined recognized conditions;

25 wherein the impedance detecting circuit comprises a plurality of resistors, which couples together in parallel, for providing the first, second and third resistance and each of the first, second and third digital values is a multi-bit number.

Claim 25 (Previously Presented): The apparatus of claim 24, wherein the impedance detecting circuit comprises:

5 a switching circuit for selectively coupling at least one of the resistors to the external device and thereby sequentially generating a the first, second and third analog signals which are respectively converted into the first, second and third values by the analog-to-digital converter.

Claim 26 (Previously Presented): The apparatus of claim 24, wherein at least two of the first, second and third predetermined ranges are different.

10

Claims 27-28 (Cancelled)

Claim 29 (Previously Presented): The apparatus of claim 24 further comprising:

15 a connection detecting circuit, coupled between the jack and the impedance detecting circuit, for determining whether the external device couples to the jack such that the impedance detecting circuit generates the first, second and third analog signals when the connection detecting circuit determines the external device being coupled to the jack.

20 Claim 30 (Previously Presented): The apparatus of claim 24, wherein the control circuit disconnects the coupling relation between the impedance detecting circuit and the jack after determining the type of the external device.

Claim 31 (Previously Presented): The apparatus of claim 30 further comprising:

25 a multiplexing circuit for coupling the external device to an internal circuit according to the type of the external device determined by the control circuit.

Claim 32 (Previously Presented): The apparatus of claim 24 further comprising:

a decoder, coupled to the control circuit, for receiving a first number of outputs from the control circuit and thereby generating a second number of outputs; wherein the second number is larger than the first number.

- 5 Claim 33 (Currently Amended): A method for automatically determining a type of an external device, comprising:
providing a plurality of predetermined resistances by a plurality of resistors coupled together in parallel;
generating a first analog signal according to a first coupling relation between a the
10 plurality of predetermined resistances and an impedance of the external device;
generating a second analog signal according to a second coupling relation, which is different from the first coupling relation, between the plurality of predetermined resistances and the impedance of the external device;
generating a third analog signal according to a third coupling relation, which is
15 different from the first and second coupling relations, between the plurality of predetermined resistances and the impedance of the external device;
respectively converting the first, second and third analog signals to first, second and third digital values; and
determining the type of the external device when the first digital value falls within a
20 first predetermined range, the second digital value falls within a second predetermined range, the third digital value falls within a third predetermined range and all of the first, second and third ranges together indicate a same recognized condition among a plurality of predetermined recognized conditions[[]];
25 wherein each of the first, second and third digital values is a multi-bit number.

Claim 34 (Previously Presented): The method of claim 33 further comprising:
decoupling a first resistor of the plurality of resistors from the impedance of the

external device before coupling a second resistor of the plurality of resistors to the impedance of the external device;
decoupling the second resistor from the impedance of the external device before
coupling a third resistor of the plurality of resistors to the impedance of the
5 external device; and
decoupling all of the plurality of resistors from the impedance of the external device
after constituting the recognized condition.

Claim 35 (Previously Presented): The method of claim 33, wherein at least two of the first,
10 second and third predetermined ranges are different.

Claims 36-37 (Cancelled)

Claim 38 (Currently Amended): An apparatus for determining a type of an external device,
15 comprising:
a jack for coupling the external device;
an impedance detecting circuit, coupled to the external device through the jack, for
generating a first analog signal according to an impedance of the external device
and a first resistance, a second analog signal according to the impedance of the
20 external device and a second resistance and a third analog signal according to the
impedance of the external device and a third resistance, the impedance detecting
circuit comprising:
a plurality of detecting paths coupled together in parallel, each of the detecting
paths comprising a resistor and a transistor coupled together in series, and
25 on/off conditions of the transistors determining the first, second and third
resistances;
an analog-to-digital converter, coupled to the impedance detecting circuit, for
converting the first, second and third analog signals to first, second and third

digital values; and
a control circuit, coupled to the analog-to-digital converter, for determining the type
of the external device when the first digital value falls within a first predetermined
range, the second digital value falls within a second predetermined range, the third
5 digital value falls within a third predetermined range and all of the first, second
and third predetermined ranges together indicate a recognized condition among a
plurality of predetermined recognized conditions;
wherein the first, second and third resistances are different and each of the first,
second and third digital values is a multi-bit number.

10

Claim 39 (Previously Presented): The apparatus of claim 38, wherein the plurality of
detecting paths comprises:

a first detecting path comprising a first resistor and a first transistor coupled in
series;

15

a second detecting path, coupled to the first detecting path in parallel, comprising a
second resistor and a second transistor coupled in series; and

a third detecting path, coupled to the first and second paths in parallel, comprising a
third resistor and a third transistor coupled in series;

20

wherein the first resistance is determined when the first transistor is switched on and
the second and third transistors are switched off, the second resistance is
determined when the second transistor is switched on and the first and third
transistors are switched off and the third resistance is determined when the third
transistor is switched on and the first and second transistors are switched off.

25

Claim 40 (Previously Presented): The apparatus of claim 38 further comprising:

a connection detecting circuit, coupled between the jack and the impedance detecting
circuit, for determining whether the external device couples to the jack such that the
impedance detecting circuit generates the first, second and third analog signals when

the connection detecting circuit determines the external device being coupled to the jack.

5 Claim 41 (Previously Presented): The apparatus of claim 38, wherein the control circuit disconnects the coupling relation between the impedance detecting circuit and the jack after determining the type of the external device.

10 Claim 42 (Previously Presented): The apparatus of claim 41 further comprising:
a multiplexing circuit for coupling the external device to an internal circuit according to the type of the external device determined by the control circuit.

15 Claim 43 (Previously Presented): The apparatus of claim 38 further comprising:
a decoder, coupled to the control circuit, for receiving a first number of outputs from the control circuit and thereby generating a second number of outputs;
wherein the second number is larger than the first number.